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(19)

(54) AUTOMATIC MAIL SENDING SYSTEM

(71) We, INTERNATIONAL STANDARD ELECTRIC CORPORATION, a Corporation organised and existing under the Laws of the State of Delaware, United States of America, of 320 Park Avenue, New York 22, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the transmission of mail.

A system for the transmission of mail has previously been described in which letters are sorted into special mailboxes according to their destinations. At a dispatch post office, the letters for one place of destination are opened in a machine, "read" electronically and the information is transmitted as electronic pulses over a coaxial cable or by radio to the post office of destination. At the post office of destination, an exact copy of the original communication is formed from these pulses, which is folded by machine, put in an envelope and sealed. For the transmission of the pulses, it is, of course, possible to use a transmission path employing communication satellites. Such a system was in operation between Washington, Chicago and Battle Creek (Michigan) ("Fernmeldepraxis" 1961, pp.210 and 933-937).

This sytem, which is usable only for particular destinations, needs a high-quality communications link and requires personnel for clearing the special mailboxes and for sorting the mail according to the destination.

The present invention is concerned with a system which is less limited to the number of directions in which the mail can be sent and requires a minimum of personnel.

According to one aspect of the present invention there is provided a system for transmitting mail in which a sheet carrying a machine-recognizable character combination as a destination address is fed into a sending station which transmits information contained on the sheet over a normal telephone subscriber line to an associated exchange, the sheet being provided with a receipt after the transmission of the information, the destination address is evaluated at the exchange and then stored together with the information, a path is set up automatically through the telephone network to a destination station in response to the stored destination address and the associated stored information is then transmitted, and reproduced in a receiver at the station of destination in a known manner.

According to a further aspect of the invention there is provided an electronic letter service system in which exchanges of a switching network have a respective letter sending device connected thereto, the letter sending device including appartus for receiving sheets of paper, means for causing a store in an associated exchange to be seized, means for causing an electro-optical scanner to scan information on the sheet and to transmit the scanned information to the store in the associated exchange, control means associated with the store for evaluating a destination address associated with the information on the sheet and for establishing a path in the switching network to a destination associated with the address and means for transmitting the information in the store over the said path to means for reproducing the information as a letter at the destination.

This invention offers the advantage that the existing public telephone network can be utilized.

In one embodiment of the invention the traffic carried by the telephone network is continuously checked, and the setting-up of the paths is initiated if traffic falls below a predetermined value, or the paths set-up are disconnected if the predetermined value is exceeded. This has the advantage that the telephone network, which is designed to handle the telephone traffic during the peak

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periods of a day (busy hour) can additionally be utilized during times of little traffic. Thus, a network need not be expanded for the additional transmission of mail.

It is also possible for a redundancy reduction to be carried out in the exchange before the information is stored. This has the advantage that the transmission time can be shortened.

Yet another feature of the invention that can be employed is that, after the setting-up of a path to a destination, further information with the same destination address can be read from the store and transmitted over the path that has been set-up. This has the added advantage that the repeated establishment of connections to one and the same destination are not necessary.

A preferred embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 is a block schematic diagram providing a general representation of a network;

Fig. 2 is a schematic circuit diagram showing details of the control at the sending station, and

Fig. 3 is a block schematic circuit diagram showing the equipment in an exchange.

In the system shown in Fig. 1, a plurality of sending stations SST are connected via subscriber lines TL to subscriber line circuits TS in an associated telephone exchange. A sender must write his letter on a standardzied sheet of note-paper and specify therein the destination address at a definite point.

The sender then puts this uncovered sheet of paper in the sending station and pays a fee. Further details will be explained below with reference to the other figures. The sending station contains a television camera, which scans the sheet and transmits the information to a storage system Sp in an exchange VSt. Having stored the information, the storage system sends an acknowledgement signal back to the sending station SSt, where the sheet is given a receipt indication and returned to the sender. The sending station is now available for the transmission of further letters.

Of the letter information stored in the storage system Sp, the destination address is then evaluated during times of little traffic, preferably at night, and a corresponding path is set up to an exchange VSt' associated with the place of destination; the stored information is then transmitted to the storage Sp' of this exchange where it is temporarily stored; then it is transmitted to the desired receiving station ESt. By suitable organisation of the destination addresses it is also possible to transmit the information directly to the receiving station. On the other hand, however, it is also possible to pass on the information on the well-known principle of telegraph store-and-forward type exchanges. A combination of direct dialling and store-and-forward type exchange in is possible, too. At a receiving station ESt the information is reproduced in a known manner, electro-magnetically or electrostatically. To observe the privacy of letters, these reproductions are now sealed automatically. This may be done by putting them in window envelopes. The reproductions sealed in this way can then be delivered to the addressees by the personnel of the post office.

Since the sending stations replace mailboxes, they are preferably installed in or at coin telephone booths or in post offices in suitable numbers. Furthermore, senders with a large letter volume may have sending stations installed at their own offices.

If a zip i.e. postal or other code is used as the destination address, all mail intended for one destination will arrive at one point. It is possible, however, to extend this Zip or other code by one or more places; in this case, receiving stations in the respective delivery post offices can be selected directly. It is also possible to allot to addressees receiving a large amount of mail an expanded destination address of their own and to install a receiving station at their offices. In these receiving stations, the sealing of the received mail can be dispensed with.

Fig. 2 shows schematically details of the control of a sending station. In this sending station, the input of sheets of note-paper is blocked by a flap until the postage has been paid by the insertion of cash. Having been checked for authenticity and correctness in a known manner, an inserted coin M actuates a sensing contact FK which closes an operating circuit for an occupation relay B which then holds itself via its own contact *b* Also energized by this circuit are a magnet E for unlocking the input, a relay L for turning on a light, and a relay W for controlling the photoelectric recognition of a mark provided at a definite point on the sheet of paper. The letter can now be put in. With its contact wl the relay W completes a request circuit via an *a*-wire to the letter storage in the exchange if the mark recognition device in sending station SSt has determined that the letter was put in correctly. If the letter storage is vacant, it will return a ground pulse over the *b*-wire, and at the sending station a start relay S will respond via operated contact w2 and then hold itself via its operated contact sl. The request circuit is opened by a contact s2, and a camera tube TV is turned on by contact s3; the camera tube can now scan and transmit the letter illuminated by the lamps already turned on.

After the letter has been scanned, a clearing-signal relay Sz picks up and prepares the circuit for an acknowledgement relay Q. When all information has been stored in the exchange, and if a check has shown that the destination address is capable of being evaluated, the relay Q operates; it controls the printing of a receipt indication on the sheet of note-paper which indication, if stamps are used, cancels the latter and, as the contact *q* opens, places all actuated switching means in the normal position. The receipted sheet of note-paper is then returned and can be used by the sender as a voucher. If, for example, the letter was inserted improperly, or the combination of numbers could not be recognized, no receipt is given and the sender is asked to repeat the input operation in the correct manner.

If sending stations are provided at offices, the coin collection mechanism can be replaced for example by a counting mechanism such as that used in franking machines. In this case, the opening of the input flap can be made dependent on the connection of the counting mechanism.

It is also possible to pay the postage simply by machine-recognizable and defaceable marks or by the insertion of coins. A combination or coin insertion and mark has the advantage that the collecting device need not be changed in the case of changes in the rates of postage. It is then sufficient to change the recognition circuit for the mark values, which is accommodated in the storage device.

The sending station SSt may be connected directly via a subscriber line TL or, as in the case of a two-partly line, via a changeover switch Um (Fig. 3) to a subscriber circuit TS in the exchange.

If the subscriber line is seized by the sending station SSt, a changeover is effected in the subscriber line circuit TS to an interface IF. If a core store, e.g. KS pl, is vacant, the starting pulse referred to above is transmitted to the sending station, which now begins the line-by-line scanning. The received information is written into the core store KSp.

At a definite point in the letter format, the store KSp expects the destination address in the form of an electronically readable number combination of different length. The store receives the address, also resolved into picture elements. These picture elements, transmitted in defined lines from the television camera at the sending station to the store and corresponding to the number combination representing the address, are compared in an address reader AL with a preprogrammed "number mirror" and recognized and evaluated as a complete address. Only if the result is positive does the store KSp store the rest of the letter completely and is the receipt of the letter acknowledged by transmitting a signal to the sending station. This signal initiates the operations already described with reference to Fig. 2.

The letter stored in the core store KSp is then reduced in a redundancy compressor RK by the redundancy contained therein and is subsequently stored together with the destination address in a magnetic disc store PSpl or PSp2 via a disc control PSt. These magnetic disc stores are mass stores which are capable of storing the volume of letters mailed in the area of the exchange in one day. All operations are controlled with a control unit St in the exchange.

During times of little traffic, preferably at night, the stored information is transmitted to the destinations. If a Zip code is given as the destination address, it is first translated, in a translator Umw, to the corresponding call number. Under the control of the programme control device Pr, a path is then set up to the desired destination via the interface IF and the junctor Ue, and the stored information is transmitted. By suitable organization in the magnetic disc store it is possible to read and transmit all information intended for one and the same destination successively after a path has been set up. This results in a sort of "mailbag formation". Depending on the letter volume for individual destinations, it is also possible to set up several paths simultaneously.

As a rule, the information is passed through modems M1, M2. At the place of destination the incoming "letters" are stored in the magnetic disc stores EStl of the exchange and then transmitted to the receiving station ESt, or the receiving station can be dialled direct, with the switching grid being set by the call number.

If traffic falls below predetermined values, traffic-metering devices connected to groups of directional lines of the exchange can send a signal to the storage system. The transmission of "letters" in that direction is then started, and "letters" provided with a special "express" indication are transmitted first. Analogously, a transmission will be interrupted if traffic exceeds a predetermined value.

The letters, printed and sealed at the post office delivery stations during the same day on which they were mailed or during the night and possibly in the early morning hours, are then delivered to the addressees.

WHAT WE CLAIM IS:—

1. A system for transmittting mail in which a sheet carrying a machine-recognizable character combination as a destination address is fed into a sending

station which transmits information contained on the sheet over a normal telephone subscriber line to an associated exchange, the sheet being provided with a receipt after the transmission of the information, the destination address is evaluated at the exchange and then stored together with the information, a path is set up automatically through the telephone network to a destination station in response to the stored destination address and the associated stored information is then transmitted, and reproduced in a receiver at the station of destination in a known manner.

2. A system as claimed in claim 1 in which traffic carried by the telephone network is continuously checked, and a path for the transmission of the said information is set up if traffic falls below a predetermined value, or is disconnected if traffic exceeds the predetermined value.

3. A system as claimed in claim 1 or claim 2 in which redundancy reduction is performed in the exchange prior to the storing of the information.

4. A system as claimed in any one of claims 1 to 3 in which after a path has been set up to a destination, further information with the same destination address is read from the store and transmitted over the path that has been set up.

5. A system as claimed in any one of claims 1 to 4 in which the transmission of information to a respective destination is effected on the well known principle of store- and -forward type exchanges.

6. A system as claimed in any one of claims 1 to 5 in which an exchange includes a translator which translates the destination address into a corresponding called number.

7. A system as claimed in any one of claims 1 to 6 in which an expanded Zip code is used as the destination address so that a receiver at the post office delivery station or at an address receiving a large amount of mail can be selected directly.

8. A system as claimed in any one of claims 1 to 7 in which a fee is paid in cash and/or by marks capable of being recognized and cancelled by a machine at the time the letter is introduced into the sending station.

9. A system as claimed in claim 8 in which the fee is registered in connected registers, and the sending station is unlocked only if a register is connected.

10. A system as claimed in any one of claims 1 to 9 in which the sending station is accommodated in or at a coin operated telephone booth.

11. A system as claimed in any one of claims 1 to 10 in which the sending station has a television camera for scanning the information.

12. A system as claimed in any one of claims 1 to 11 in which for unlocking the equipment, the sending station, in addition to supervising the payment of a fee, evaluates a "clear" criterium from the store at the exchange.

13. A system as claimed in any one of claims 1 to 12 in which the store at the exchange also stores information arriving from other exchanges and then passes the said information on to receivers associated with respective destination addresses.

14. An electronic letter service system in which exchanges of a switching network have a respective letter sending device connected thereto, the letter sending device including apparatus for receiving sheets of peper, means for causing a store in an associated exchange to be seized, means for causing an electro-optical scanner to scan information on the sheet and to transmit the scanned information to the store in the associated exchange, control means associated with the store for evaluating a destination address associated with the information on the sheet and for establishing a path in the switching network to a destination associated with the address and means for transmitting the information in the store over the said path to means for reproducing the information as a letter at the destination.

15. A system for the transmission of mail substantially as described herein with reference to the accompanying drawings.

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3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

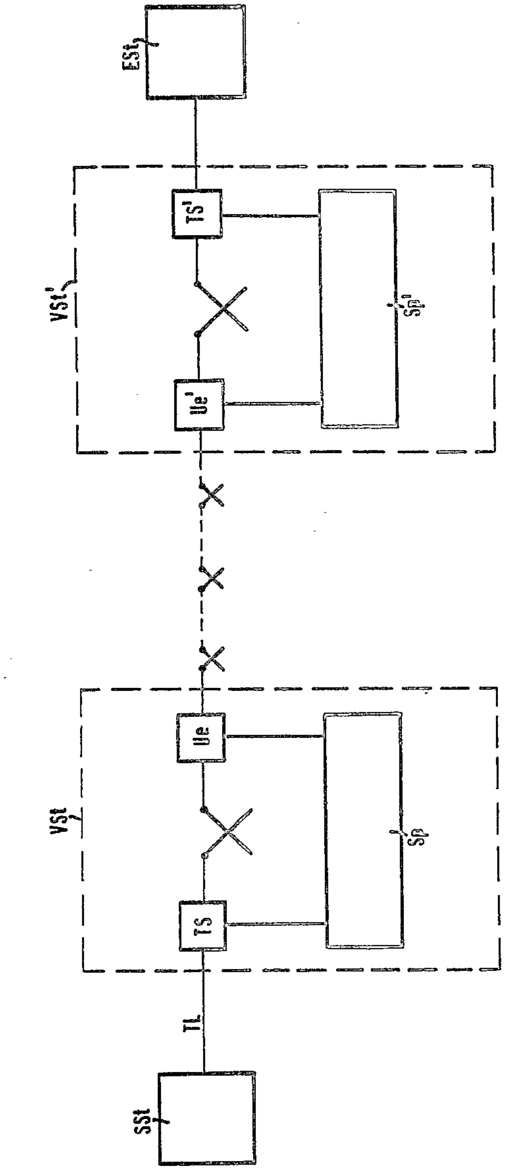

Fig.1

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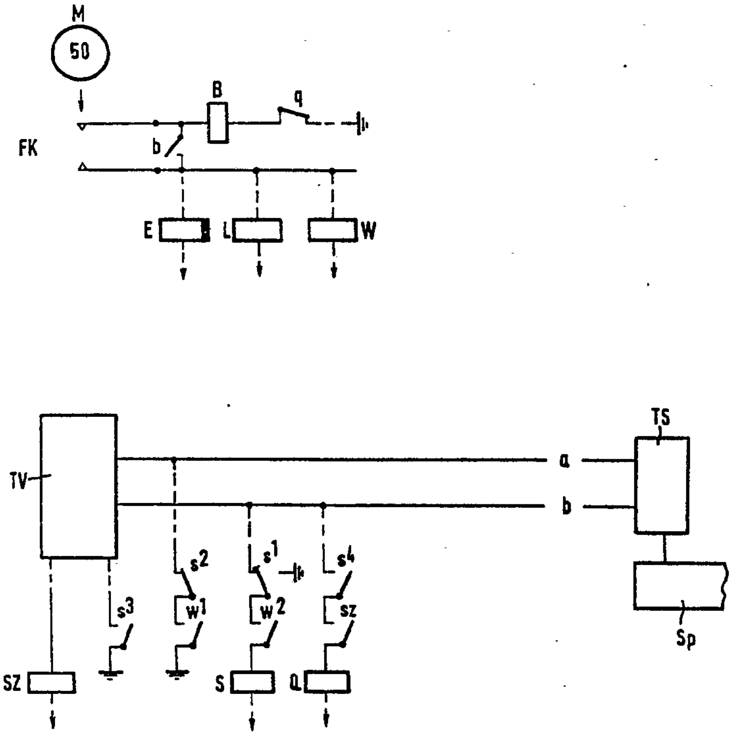

Fig. 2

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1493897 COMPLETE SPECIFICATION

3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 3

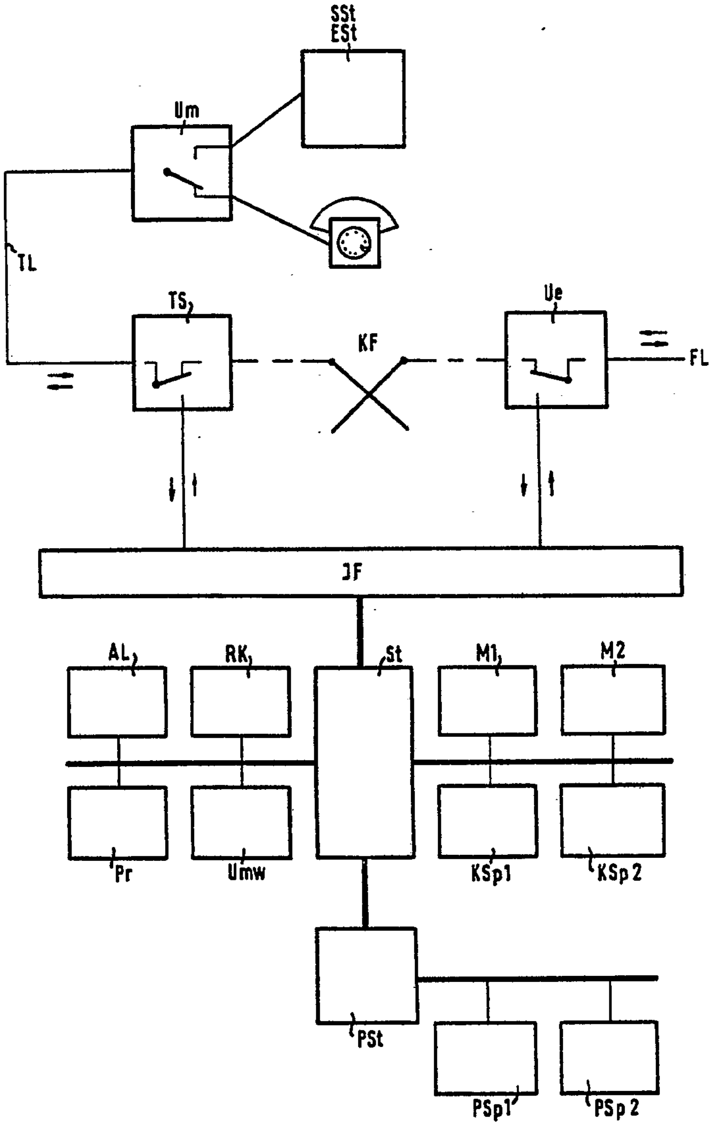

Fig.3

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